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KNOTTING MATTERS

The Magazine of the International Guild of Knot Tyers

INTERNATIONAL GUILD OF KNOT TYERS

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THE MAGAZINE OF THE INTERNATIONAL GUILD OF KNOT TYERS

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The editors welcome the submission of letters, articles, photographs and sketches for publication. Correspondence may be by e-mail knottingmatters@igkt.net but more extensive items, such as articles for publication, as well as any pictures, which should be of good quality, need to be sent as attachments. All submissions must include the author's name and e-mail or postal address.

To publicise events in *Knotting Matters*, note March, June, September and December are the months of publication. Although the deadline for the next issue is given at the foot of the Contents page, please note that the editors begin putting it together at least three weeks earlier.

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MEMBERS BULLETIN

Those of you who agreed to allow us to send you emails should have had several Bulletins by now. If you haven't then please do as follows:

1. Check your spam and junk folders as some people have found their mail boxes have filtered them out. If so add it to allowed mail.
2. If you still can't find them send us a message.
3. A number of members have had their messages bounced back as they have a different address to the one we have.
4. Lastly, if you initially asked for no messages but would like to have the Bulletin please let us know.

Please send all responses to this message to secretary@igkt.net.

PLEASE NOTE: SUBMISSIONS FOR THE SEPTEMBER 2024 KNOTTING MATTERS MUST BE RECEIVED BY 1ST OF AUGUST 2024

FRONT COVER: JOANA ASTOLFI SEE LETTER TO EDITORS P 12 AND ARTICLE P 13.

Editorial

I've always loved Richard Hopkin's salutation to the Editors, "Hello Cerberus". Cerberus is the three-headed dog protecting the entrance to the underworld and the mysteries it contains. Over the millennia, Cerberus has also been described with as many as 50 or 100 heads. Richard's use of that salutation was a nod to the editorial team of three, but to me, it encapsulates the collaboration and team work that makes an organization like IGKT and its publication, *Knotting Matters*, work. It is us, together, guarding the mysteries of knotting and passing our knowledge on to future generations.

Letters to the Editors will now use that greeting, so keep the letters, articles and projects coming Cerberus! Help us get KM165, Dec 2024 larger that 100 pages!

Submissions often require an outreach for more information and they provide interesting avenues for exploration for current or future articles. It is you, Cerberus, that brought to our attention the work of Joana Astolfi. Her beautiful installation at the Oceanário de Lisboa is on the cover. See p 12 and p 13.

The article, p 14, on the David MacGregor Library at the SS Great Britain in Bristol was new information to me. It is now on my "must visit" list. Please drop us a line and let us know about your visit.

The technical details and literary intracacies of the "Knotting Tower of Babel" on p 25 remind me that there is a lot of science behind knotting.

The range of articles in this issue, shows the diverse skills of our members. Based on feedback from the IGKT AGM 2024, this issue was cut back to 48 pages to save on postal costs. If your submission did not make it, my apologies, it was FIFO, not merit. We plan on having a much larger issue for the holiday season in the December issue. Cerberus, you are on notice.

New for this issue, cartoons on p 12 and p 41. I hope it enhances your skills for recognizing AI generated images. — Steve Drew

EDITOR WANTED

Do you enjoy your quarterly *Knotting Matters*? Do you have word-smithing, publishing or layout skills? Editorial work takes 20 - 30 hours per quarter (max 2.5 hours / week).

Contact — knottingmatters@igkt.net.

New Chair of Trustees

I thought I would write a few words to introduce myself.

As a lifelong sailor, I was introduced to the usefulness of knots as a young child and always harboured an interest. About 35 years ago, I knocked on Des Pawson's door and bought some small cord to try tying but it wasn't until later years that I found time to really expand my knowledge. Finding decent cord to tie knots was a challenge, one that took me to Mikko Snellman's website which not only provided cord but also some projects which I worked my way through and learnt more about decorative marlinspike work. Finally, starting to design my own things, I needed more cord which led me to learning to make my own. Finding that I could make cord freed up my ability to design and make things that were in my head!

From there I went to the IGKT Weymouth meeting and joined the Guild. Within the year, I left my day job to rig a fleet of seven classic yachts, making knotwork and leatherwork commissions in between rigging.

I became a Trustee in early 2023 and then was asked to step up to act as Chair of the Trustees on the retirement of Sheila Pearson. I am a believer that if you take something from an organisation you should also give back so here I am and I urge you to think what you can do to support the outreach of the Guild and keep it thriving into the future.

— Sue Pennison

PROOF-READER WANTED

Can you read this ? Did you find mis-takes? Then you have the skills to be a *Knotting Matter*s proof-reader. There is room for just one more proofreader; no time commitments, no deadlines, just spot what needs korrecting and let the editor's no . Help us improve each issue, and get advance viewing on future stories. Email us with the 7 errors. Contact — knottingmatters@igkt.net.

Letters to the Editors

Hello Cerberus,

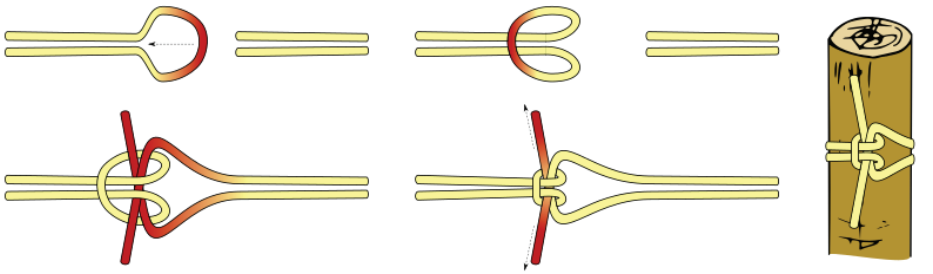
Having seen the Sokol knot in the latest KM (Issue 162, p 16, March 2024), I wondered if the attached pictures would be of interest given the similarities?

The pictures came from IGKT France and further information would be happily given if you ask Jean-Paul or Antoine. I forget who actually came up with the knot.

The enquiry about Sokol was sent to a number of knotters to see if it was in fact a new knot and I was struck then with the ease with which it works.

I think the consensus was that someone must have used it before, but it had not been documented. Then again, we thought the same about Hunter's bend.

Best wishes to all,
Richard Hopkins.



Hello Cerberus,

The Sandbrook Bend (*KM* 162, p 17, March 2024) is not a new knot. It is well mentioned in *ABOK #1425* at p 260.

I am inviting IGKT members to visit my 6 knotting Google Drive folders for reference and share to others. These links are tabulated in my posts in the IGKT Forum.

They are:

1. Bends Classed By Starts - https://bit.ly/KM163-1

2. My New Bends - https://bit.ly/KM163-2

3. My Other Tying Methods of Some Known Knots - https://bit.ly/KM163-3

4. About Bends - https://bit.ly/KM163-4

5. Bends Grouped By Appearances - https://bit.ly/KM163-5

6. My New Knots - https://bit.ly/3vSHbb5

— Wui-Yuen Chan (aka y Chan) Hong Kong

Hello Cerberus,

I recently started a knotting project that is ideal when waiting for or sitting in public transport: keychains made of 1m (3.2ft) Paracord 550. I use and combine several knots: snake, (doubled) diamond, (extended) crown and diamond, (twisted) solomon bar and *ABOK* #545 and #779.

The possible combinations are endless. Some of them are shown in the photo below and again on the back cover.

Kind regards,

— Alex / Vienna/Austria

Hello Cerberus,

I find it fascinating that rope is a part of everyday life with traditions that go back centuries. I wanted to share an observation I had while watching folk dancing in the South of England. Traditional English folk dancing may conjure up images of Morris Dancers dancing with sticks and twirling hankies. I watched The Basingclog Morris group, who, instead of twirling hankies, twirl a "hank of plaited cotton". One of the members explained that a hank of plaited cotton was traditional in the northwest due to the cotton mills in their home town. You can spot the hanks hanging off their waists while dancing (p 9) and depicted on the drum below. See: https://www.basingclog.org.uk/

Another traditional dance, I noticed recently, is the Dabke or Dabbah performed in Arabic countries such as Syria, Palestine and Jordan. The leader of the dance will twirl a hankie or a knotted cord as they dance. I have read the twirl is for keeping timing and would speed up if they wanted the dance to speed up.

I would love to hear if anyone knows of a similar thing near to you.

— Adam Masters

The Basingclog Morris Group with a "hank of plaited cotton".

Hello Cerberus,

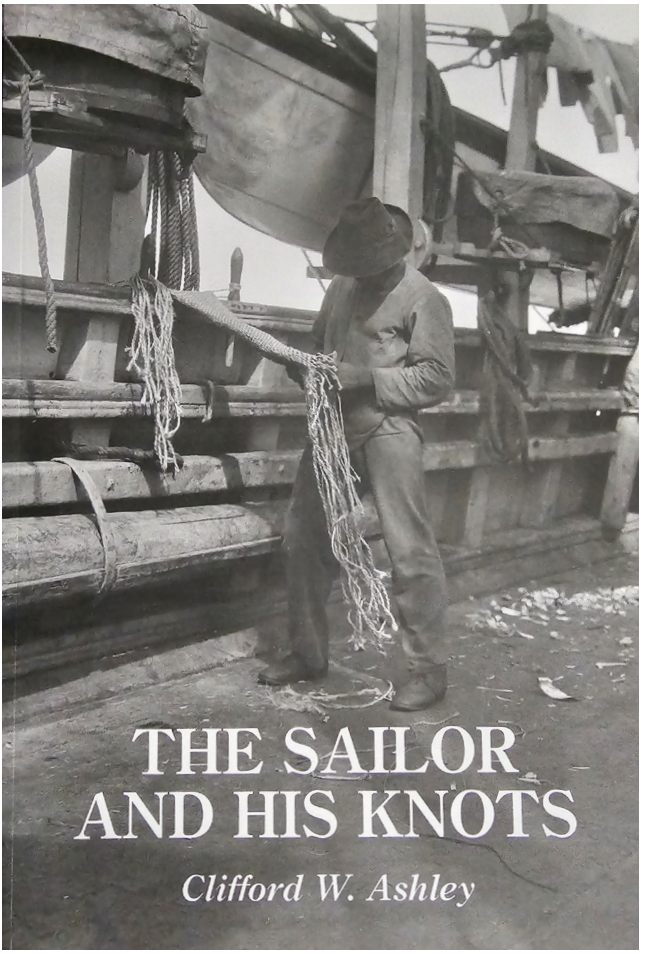
Do you know of anyone who teaches knot tying in the SW of England? I live in Marlborough and would be very interested in doing an introductory lesson or course in person with someone knowledgeable.

With thanks,
Ashley Wilsey
ashleywilsey79@gmail.com

Hello Cerberus,

The IGKT Council of Trustees have agreed to donate a number of Ashley's *The Sailor and His Knots* to as many maritime or waterways museums as possible. We'll include one of our new leaflets and the museums can then sell the books. Further copies we will supply at cost. This should help spread IGKT word and allow us to put some of George Hart's donations to good use.

If you know of a worthy museum, please email treasurer@igkt.net.



Ed — If you don't have this gem in your library, see IGKT Sales p 47.

Hello Cerberus,

I'm recently interested in all kinds of knots that make life easy. I think I have a new knot. My video shows it being tied two ways. I believe it is a "marriage" of a Hunter's bend and Zeppelin bend, but that it's better than those two. Please let me know what you think. Thank you!

— Binh

BL_Hunter_Zeppelin Bend.MOV

https://bit.ly/KM163-7

Hello Cerberus,

KM162 "Custom Cord Sources" p 19 by Rich Cifelli and the editor's note on p 23 highlight some of the ropemakers around the world that need our patronage.

I recently ran across Caroline Rodgers who makes cotton rope in Askrigg in the heart of the Yorkshire Dales. Askrigg Ropemakers, askrigg-ropemakers.co.uk is just one of eleven traditional manufacturers left in the country. Caroline is the only female carrying on this heritage craft in the UK.

I ordered 10 traditional jump ropes to donate via www.PackforaPurpose.org, to the charity FRANCO, which benefits children in Franschhoek, South Africa. I'm sure those children will be thrilled to get one of these next Christmas.

— Robert Earl
Peterson Croquet (#PICT45)

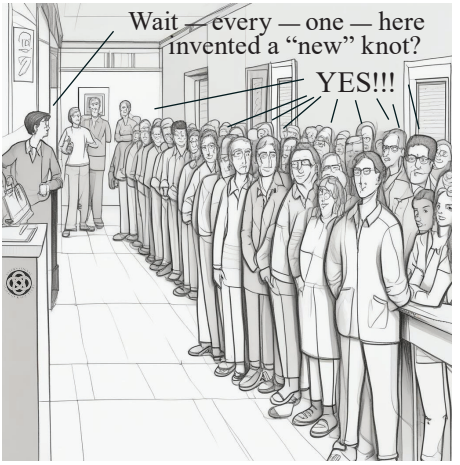
Ed — The IGKT, the Trustees, and KM Editors, are not the arbiters for deciding on the originality of knots. You, our members however, do have considerable skills and knowledge. Engage with your fellow knotters on the IGKT forum and social media. Share your thoughts, challenges, questions and discoveries and promote IGKT.

Dear Editors

While one of my daughters was on holiday in Portugal, she visited the aquarium in Lisbon, Oceanário de Lisboa, where there was this display made entirely from rope.

Mark Richmond.

Ed — Love it. The aquarium put us in touch with the artist, Joana Astolfi. Her work graces our cover and some additional information is on p 13.



#SeaTheFuture
by Joana Astolfi

Joana Astolfi, www.studioastolfi.pt, designed and installed the exhibit at the Lisbon Oceanarium that was brought to our attention by IGKT member Mark Richmond. Using cotton cord and ropes she created a phantasmic undersea world.

“We see a world with a future. A world filled with responsible choices, with local products and sustainable materials. Each choice is an opportunity to make a difference and protect the ocean. Join us. The future starts here.” — Joana Astolfi

Visit the IGKT Library

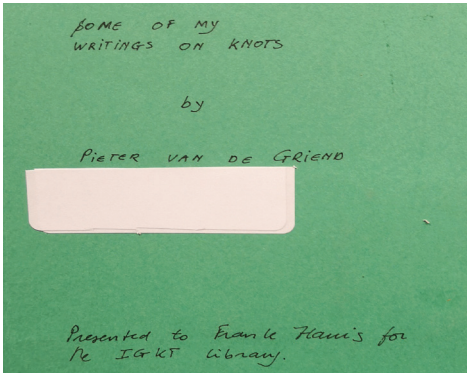
by Adam Masters

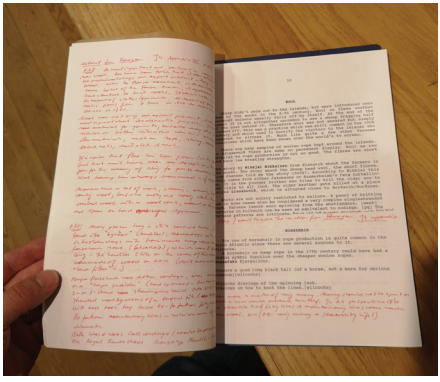
I had heard the IGKT library's new location was within a two-hour drive from me, and it has been on my list of places to visit. Its now housed at the David MacGregor Library at SS Great Britain in Bristol, UK. The David MacGregor Library houses many specialised maritime books and records, and the IGKT library has found a fitting home. The selection of books from the IGKT library and the 20 boxes of Des Pawson's donated books cover a wide range of subjects. Like a child in a sweet shop, I wasn't sure where to start, so in my short visit I concentrated on the three shelves of practical knot books and the further three of decorative knots. The Staff were very welcoming and helpful. They are still in the process of cataloguing and sorting the books and explained that not all the books are displayed, but, with empty shelves nearby, I hope they will soon be filled with more of the collection. I asked about a couple of subjects that had been catalogued but not yet shelved and they offered to fetch them for me. So, it felt that the books were in the hands of a good team.

What I found most invaluable was not the printed books (which was still brilliant), but the old hand-written notes within the books, the locally created booklets, and IGKT's books created by Guild members from years ago. This written history to me was more valuable and the most interesting to read. I just wished I had had more time. Contained between the mass printed books we most likely have on our shelves at home were the rarer older versions of out-of-print books and booklets or the predecessors to a newer version of well-known books. Looking back through these, it was interesting to see how things had changed from copy to copy. I spotted many I didn't own or even know about.

A warning to future visitors: I came away with a long wish list of future knot book purchases and you might do the same. If you are visiting the Bristol area, I would strongly suggest a visit. It was free to enter the library area. The opening times and days vary. Currently, they are Wednesday to Friday 10:30 till 16:30 and the first two Saturdays of the month. I managed to turn up with little warning, but I would suggest phoning beforehand and checking availability. If you would like to see what books are available, you can inquire via collections@ssgreatbritain.org and the contact number is +44 1174 623135.

Images top to bottom: 1) My son visits the David MacGregor Library 2) Three shelves of practical knotting books 3) Three shelves of decorative knotting books 4&5) *Some of My Writings on Knots*, unpublished, Pieter Van de Griend, IGKT


SOME OF MY
WRITINGS ON KNOTS
by
PIETER VAN DE GRIEND
Presented to Frank Flanis for
the IGKT Library.



Books

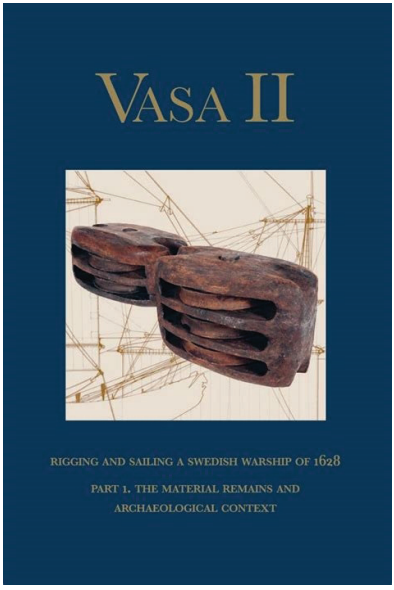
VASA II, Rigging and Sailing a Swedish Warship of 1628, Part 1 The Material Remains and Archaeological Context, (Hardback, 472 pages) Nordic Academic Press, Lund. (ISBN: 9789188909114), UK price £75.00

At last, after very many years, this serious book from Vasa Museum has been published, edited by their Technical Director, Fred Hocker. There are chapters on: Hull furniture, Spars, Tops, Tackle, Rope, Sails, Capstans and windlass, Anchors and anchor gear, Whipstaff, and Navigation. The text is all in English and very well illustrated, with 5 pages of references.

For me, one of the highlight chapters is Rope (58 pages), on ropemaking by the late Ole Magnus, almost all on ropemaking entirely by hand, before any kind of machine. Ole spent the last year of his life (he was dying of leukaemia) studying the ropes on the Vasa and putting together all he knew (in Danish). His work had then to be translated and edited: a worthy memorial.

Chapter 7, Sails (47 pages), contains work by IGKT member, the late Louie Bartos. Indeed the chapter is the fruit of a collaboration of almost 50 years, others contributing to that chapter being Sam Svensson, Sven Bengtsson and Ole Magnus, sadly all no longer alive to see the fruits of their years of study.

Also of interest to me and perhaps to members, is Chapter 5, Tackle, detailing the blocks used on VASA II (97 pages).



Be aware that this is not a “how to” book in any way, but a book on details and techniques and sources, all in the context of that incredible time capsule that is VASA II. A major reference work.

For such a big academic book the price is very good and the quality of production and illustration very high. I find that some academic publications are overpriced and poorly produced. This one is not.

I look forward to Vasa II (Part 2).

— Des Pawson

A Neglected Waif?

by Colin Byfleet

The IGKT logo of a 3-lead 4-bight Turks Head (TH) is an elegant design when flat and easy to tie arranged as a cylinder. There are many books with recipes for THs and similarly many YouTube videos.

After a non-exhaustive search, I have not found a printed version of tying a 5-lead 4-bight version. There are a few videos, the best of which is by our IGKT President, Mikko Snellman https://shorturl.at/bjkBR.

Personally, I like to have a hard copy by my side, rather than looking back and forth at a screen, so it seemed a good idea to put a 5L x 4B TH recipe on paper. As an artistic Philistine, I've put together some of the steps on a (very) stylised hand. I chose to make the knot on a hand, rather than on a cylindrical mandrel, as it is quite small and simple.

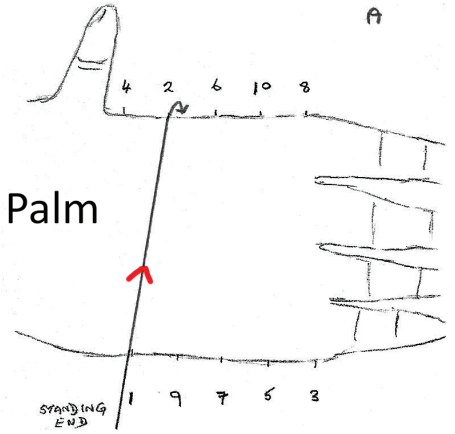
In its cylindrical form, the knot is much used as a decorative item, and also as the start of tying more complex THs. It doesn't sit well as a flat mat, in comparison with several other small THs – perhaps this accounts for its comparative neglect. But, as a saving grace, it does make a quickly tied and easily arranged globe-knot and there are just one or two YouTube offerings showing this.

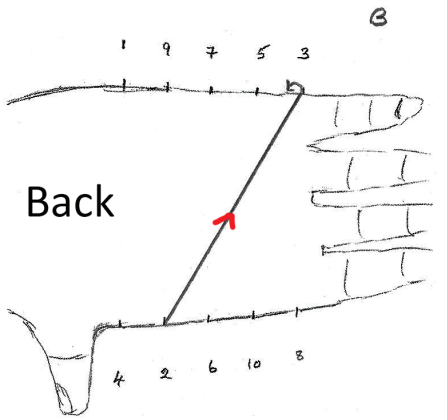
5L x 4B TH Globe

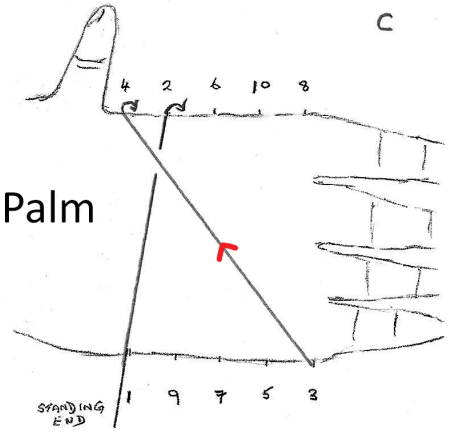
5L x 4B TH Mat

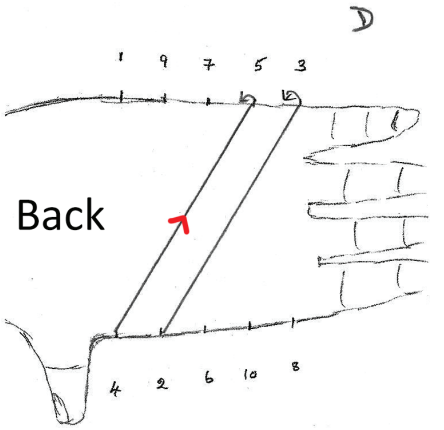
In the pictures above, I've left the knots shown deliberately unfinished and untightened so that the structure is clear. It took about 60cm (2ft) of cord for

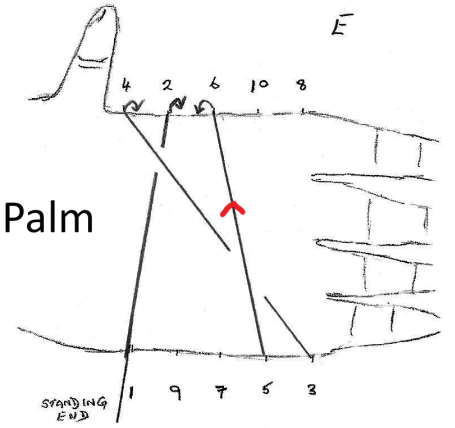
each pass of each knot and so the globe, made on a 2.5cm (1") sphere, took about 1.8m (6ft) in total.

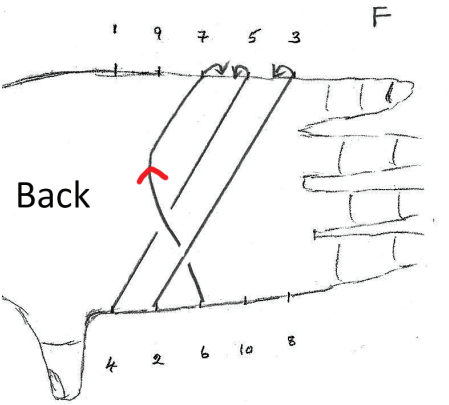




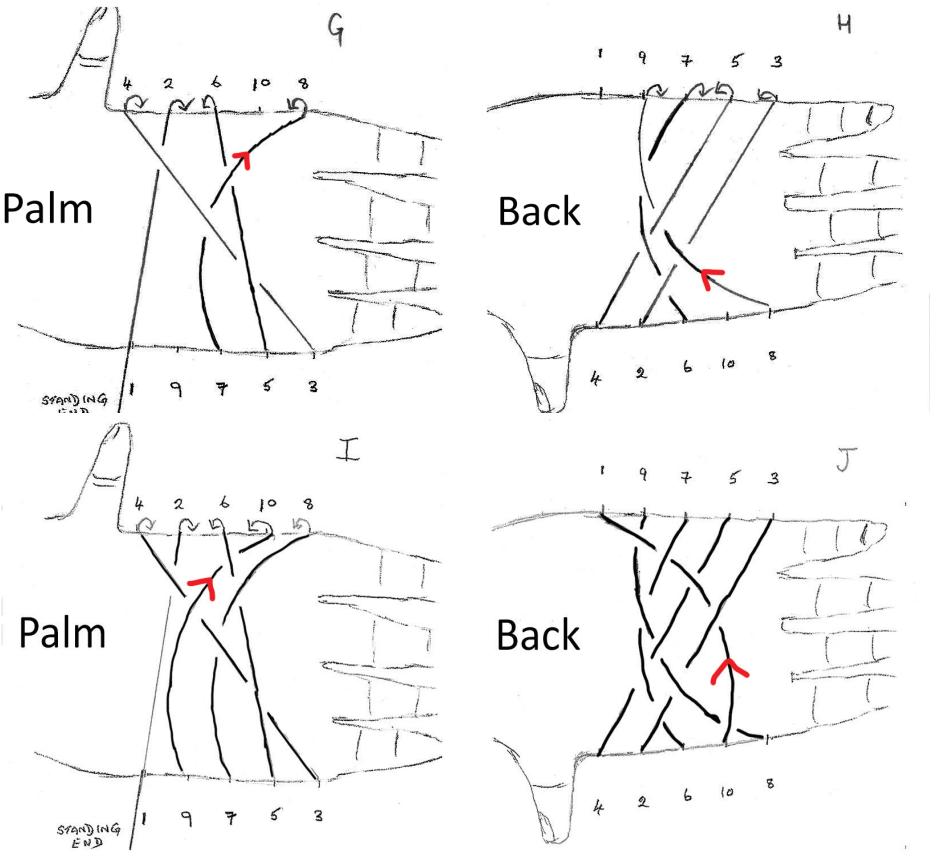








Here is the set of illustrations, labelled in alphabetical order, showing the palm and back of the hand as the knot is built up. All the turning points are numbered, and the line being added on each diagram is shown with a red arrow. It is worth noting, in each of the images E, H and J, that the final crossing is always over the immediately previous line.



As with all THs, the final step is to bring the cord arriving at point 1 in diagram J and re-insert it into the knot, parallel to the standing part.

The knot can then be adjusted for size; two or three more passes made and a spherical core inserted to form the globe knot.

After a little practice, the time taken to complete the first pass was about 1m 30s to 2m. Not bad for a pleasing result!

Have fun!

Turks Head Pens

by Mark Delaforce (aka Blood Knot)

Introduction

I was asked to write an article by the International Association of Pen Turners, maybe not quite as obscure as the IGKT, but may I say, perhaps equally 'niche'.

Making the first pen, I made up the process as I went along, and a lot of trial and error was involved in determining the best cord and knot size for the project. For the second pen, I was given a lot of patient assistance by Jim Caswell, a fellow Australian member of the IGKT, knot tyer, leather braider and by my standards, if not his, a mathematician. Thanks Jim, very much.

My goal was to create a pen that was both attractive and comfortable to hold and after many trials with different knots and cord diameter I found a wide Turks Head using cord of 1 mm diameter or less was ideal.

Note: I make and sell a relatively hard laid three strand cord under the name 'Blood Knot' https://bloodknot.bigcartel.com/. My cotton cord is made in a traditional twisting process, and it stretches and compresses very little when tensioning the knots.

Making the Pens

I have made two pens using cordage. Neither is perfect, but I'm teaching myself a technique and I'm learning with each one. Both are Fancy Slimline kits from Timberbits Australia https://www.timberbits.com/pen-making/. Each pen consists of two brass tubes about 52mm length and 6.78mm in diameter.

Pen #1 - Tools and Materials

The first pen, which I completed on 24/02/2024, was made using raw cotton cord and the following:

- Fancy Slimline pen kit
- 2 x 1.8m lengths of approximately 1mm cord
- A mandrel or jig (in this case 6mm dowel, 75 – 100mm long with five numbered pins inserted (I used 10mm nails) placed about 2 or 3mm longer than the barrel length markings at either end. See Image 2 opposite.
- Lacing needle (the cord screws into an internal threaded end)
- Haemostats, an awl or similar for tensioning the knots
- 1" Masking tape

Image 1 – Pen #1 completed with two 'tripled' 19L x 5B Turks Heads.

Pen #1 - Technique

Each of the two brass tubes were covered using a 19 Lead by 5 Bight Turks Head (19L x 5B) taken from *The Turks Head Cookbook Volume 2, p 46.*

Table 1 below shows the full pattern of the knot and indicates all the 'Over' and 'Under' passes on the previously laid strands. Use it to assist as you weave down and up the mandrel.

Turks Head (19L x 5B)												
NOTE: Start at Top Pin #1 and make almost two full turns around the mandrel down to Bottom Pin #5.	Top Pin Number											Orange = Cord direction is up the mandrel.
	1	5		4		3		2		1		
Blue = Cord direction is down the mandrel.	-	-	-	-	O	-	O	U	O	U		
	-	-	-	-	-	O	U	O	U	O		
	-	-	-	U	-	U	-	U	O	U		
	-	O	-	O	-	O	-	O	-	O		
	-	-	O	-	O	-	O	-	O	U		
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	-	-	-	-	U	-	U	O	U	O		
	-	-	-	-	-	U	O	U	O	U		
	-	-	-	O	-	O	-	O	U	O		
	5		4		3		2		1			
	Bottom Pin Number											

Table 1 - Turks Head 19L x 5B

Legend: O - Over, U - Under

Image 2 - Start from top pin 1, around once, and then on to bottom pin 5.

Note: When tying on the mandrel, do not tie the knot tightly on the pins. If you do, the whole knot will 'shrink' in length as soon as you remove them.

Once tied, the knot will need to be tensioned. This is the hardest part of the whole project as it is extremely easy to over tension the knot and 'shrink' it to a size smaller than the length of the brass tube. This is where placing the pins on the mandrel 5 or 6mm further apart than the length of the brass tubes is helpful and assists a slow and careful tensioning of the knot.

Image 3 — Pen #1 mandrel setup with numbered pins.

The completed knot is glued to the brass tube using a clear two-part epoxy. I used Gorilla Glue. After gluing the brass tube and sliding on the knot, I taped the knot tightly to ensure it was snug against the tube while the glue dried. The knot was finished with a mixture of shellac and Stockholm tar which I really like. The more coats you use the darker the finished look. The finish dries hard and has a natural feel to it. It also provides great protection to the cordage, and I think gives the pen an aged look that I really like.

Pen #2 – Tools and materials

See '(Pen #1 - Tools and Materials on p 20) with the following differences.

- 4 x 1.3m lengths of approximately 1mm cord
- A mandrel (I used 6mm dowel in this, but I think 4 or 5mm diameter would be better, 75 – 100mm long with the barrel length marked) and four pins inserted (I used 10mm nails) placed about 2 or 3mm longer than the barrel length markings at either end.

Pen #2 Technique

Image 4 - Pen # 2 (opposite) – Each tube has two intertwined (doubled) 9L x 4B Turks Heads, which when complete equate to a completed Turks Head knot consisting of 18L x 8B.

Even though we are intertwining two knots on each tube, the knots on this pen are much easier to tie.

Image 4 —Pen #2
Each tube has two intertwined (doubled) 9L x 4B Turks Head knots.

The pattern for Pen #2, starting from top pin 1 (T1) to bottom pin 2 (B2) and so on.

Knot 1 (Green) see image 4 above.

From T1 down to B2,
B2 go under all cross overs up to T2,
T2 go over all cross overs down to B3,
B3 go under all cross overs up to T3,
T3 go over all cross overs down to B4,
B4 go under all cross overs up to T1.

For the intertwining knot 2

The bights come up between the nails, so we'll call them 1.5, 2.5 etc and the process is exactly the same as the first knot except this one (the red one) goes under everything that's 'under'' and over everything that 'over' as indicated in Image 5.

Image 5 —Pen #2 Indicating Overs and Unders in the intertwined knot.

The glueing process is the same as for Pen #1. Although on a 6mm mandrel, the completed knot won't fit as tightly on the tube as it did in pen #1. I backed

the masking tape up by winding string tightly around the knot to ensure proper adhesion to the brass tube. This one was finished using a clear spray lacquer.

Lessons Learned

Do not tie the knots too tightly on the mandrel pins or the whole knot will end up shorter than you intended when the pins are removed.

If using knots described in Pen #2, consider either making a third pass in one of the colours or using a smaller diameter mandrel (jig). This may not only assist in a knot that fits more firmly on the pen barrel but may allow a more even tensioning of the knot.

LESSON FOR THE KNOT TYERS: After tying the knots on Pen #2, I was reliably informed by someone much more knowledgeable than I, that the two knots I call 9L x 4B Turks Heads are in fact intertwined Matthew Walkers (Thank you Mabel Marble from the Ropeworks Facebook Group).

Conclusion

I learned a lot making these pens, and even though I cursed and swore more than usual, I did enjoy making them. I hope someone reading this does too.

Mark Delaforce
(bloodknotcord@gmail.com)
Australia

KNOTTING MATTERS
Needs You!

We would like a couple of projects for the September and December issues. Does anyone have gift ideas, ornaments, or holiday projects for the young and young at heart to share?

Knotting Tower of Babel

by Rob Chisnall

Preamble: "What's in a name?"
(*Romeo and Juliet*, Act II, Scene II, William Shakespeare)

It is strange how the simplest things can cause confusion and even controversy. Inconsistency and ambiguity are readily apparent when it comes to knot names, structures and terminology. Even general nomenclature lacks standardization. For example, basic parts of a knotted rope have a variety of labels: end, tail, working end, active end, live end, bitter end, and wend; and standing part, standing end, dead end, stand, and stend. Robert Birch (2019a) produced an excellent knot glossary addressing this and other issues. Further, there can be multiple names for one knot. A classic example is the everyday Square or Reef Knot, which is less frequently called the Hercules or Rogue Knot. The Tumbling Thief Knot is also called the Rogue Knot, and some on-line sources mix up Reef, Thief and Granny Knots. (See "rogue knot" at https://www.oxfordreference.com for one blatant example.) Historically, two mirror-image structures have been labelled Bowline, Bowline Knot, Boline or Boling (Ashley, 1944). A more recent and esoteric example is the Monster Munter, a belay hitch which has been called the Super Munter, Double Munter Hitch, Double Italian Hitch and Double Reversed Backhand Turn (AMGA/ACMG, 1999; Tomaczak, 2020). Further, a single name for multiple knots can be encountered throughout mainstream publications. The term Square Knot applies to at least two different knots, and several knots based on the Figure Eight Knot (or Figure of Eight Knot) have been identified as Double Figure Eights.

Even the capitalization of knot names is inconsistent, although capitalizing knots named after people and places seems to be generally accepted. Ashley (1944), Budworth (1985), Graumont and Hensel (1952), and Warner (1992) capitalize knot names. Some books use no capitals while others capitalize inconsistently. Misspellings occur as well. A persistent example is the Prusik Knot (or Hitch), which is often referred to as a rope hitch or 'soft ascender' and is named after Dr. Karl Prusik. It can appear as the prusik, prussik, prussic, prussick or prusick knot throughout general, rigging, climbing and rescue publications.

Scholars who examine the evolution of language have found that regional and colloquial idiosyncrasies abound, new terms are introduced by successive generations, foreign words get adopted, and language changes in concert

with emerging technology (Bowren, 2015; Chisnall, 2020; Steels, 2017). This certainly can be said of knotting terminology. Specialty hobbies and occupations develop their own language. Consider the variety of names surgeons have adopted for different and similar suturing knots, most of which have multiple forms and alternative names: Meltzer, Inomenknot, Roeder Knot, Tennessee Slider, Duncan Loop, Purse-String Suture, Tayside Knot, Nicky's Knot (Midshipman's or Taut-Line Hitch), Weston Knot, Modified Miller's Knot, and so on (Baumarten & Wright, 2010; Khattab, 2011; Pedowitz, et al., 2015; and many other references in the medical literature). Further, errors and bias are perpetuated once they are in print or on line.

With mixed results, numerous efforts have been made to encode or standardize tying actions and essential planar knot components. Respectively, these have been referred to as movement or action primitives and object primitives or knot geons[1] in some scientific disciplines (Biederman, 1987; Chisnall, 2020; Fink & Mao, 1999, 2000; Jenkins & Matariæ, 2002; Takamatsu, et al., 2006; Vihn, et al., 2017). It is generally understood that, when conveying information about knots, accurate and unambiguous images with clearly indicated wends and stands can be more precise than language (Caron-Pargue, 1983, 1987; De Toffoli & Giardino, 2015; Santos, et al., 2019). Also, detailed tying sequences and animations are helpful. Of course there is no substitute for the hands-on experience of manipulating the knot itself (Casati, 2013; Cross, et al., 2017; Strohecker, 1991, 1996).

"Adventures in Flatland"
(The title of Chapter 5 by Ross H. McKenzie from the book, "*Condensed Matter Physics: A Very Short Introduction*")

There are several subtle details to understand when studying published materials depicting realworld knots (Chisnall, 2020). First, drawings, photographs and digital images of knots are two-dimensional representations of three-dimensional artefacts. In topological parlance, a knot picture is a planar projection (Adams, 2001). Images often simplify essential knot structures by eliminating extraneous crossing points to reveal a knot's fundamental structure. Paradoxically, vital information may be lost or obscured in some simplified depictions. Further, it is often the case that practical knots are depicted out of context. Function, attachments, wends, stands, and neighbouring knot structures are not clearly identifiable in certain illustrations. Second, the fixed structure of a knot image depends on the presenter's perspective, whereas a practical knot appears different as it is rotated in three dimensions. Of particular note here

1 Basically, geons are recognizably fundamental image components.

is the fact that a two-dimensional representation of a knot can look different from either side of the plane. Changing perspective is called aspect shifting (De Toffoli & Giardino, 2014). Third, images are static while real-world knots are dynamic and can change through differential loading and manipulation. Capsizement, flipping, flyping, and reptation can occur (Bao, et al., 2003; Chisnall, 2020; Hage, 2007). Terms such as 'spill' and 'distortion' also appear in the mainstream knotting literature – more examples of variable terminology. In topology, two-dimensional images of knots change via Reidemeister moves, which will be explained shortly (Adams, 2001; Kauffman, 1987; Rolfsen, 1990).

The application of a few basic mathematical tools offers clarity and alternative perspectives when it comes to practical knots. Topological knots have no ends and cannot be untied, whereas realworld knots usually have ends and can be untied and retied. To a topologist – a mathematician who studies knots and links without ends, as well as other multidimensional formations and phenomena – crossing number is an invariant, something that cannot change when the knot has no ends (Adams, 2001; Kauffman, 1987; Rolfsen, 1990). In forensic science, crossing number has been employed in knot identification (Budworth, 1985). In order to analyse and compare knots and links[2] in their simplest form, mathematicians reduce planar projections to their true crossing number – their minimum number of crossing points. For topological knots represented in two dimensions as planar projections, it has been mathematically proven that any link or knot can be simplified to its essential structure and lowest number of crossing points by using just three basic manoeuvres, which are called Reidemeister moves (see Figure 1, p 28).

The removal or addition of one crossing point to create or eliminate a Crossing Loop is a Reidemeister I move. Just one cord or rope segment is involved. A Reidemeister II move adds or subtracts two crossing points. An Open Loop is either crossed over or under a second segment, or it is separated from that segment. Reidemeister III moves involve three segments and three crossing points. One segment is shifted past the crossing point of two other segments. These moves can be applied to images of real-world knots, provided the ends do not come untucked. An extra rule for two-dimensional images of realworld knots with ends can be added to ensure this does not happen. In a sequence of images depicting knot changes, the ends cannot cross any standing parts or spans between pairs of crossing points. However, adjacent wends and stands can trade places to simplify a knotted structure.

Conway tangles are planar clusters of crossing points isolated within a

2 Wendless rings tangled together.

circle, and these projections intersect the framing circle in only four places (Adams, 2001). They are out of context relative to the positions of potential loops, wends and stands. This brings a knot's essential structure into focus and, for the purposes herein, facilitates a combinatoric analysis. Combinatorics is an area of mathematics that analyses the configurations, combinations and permutations of countable discrete structures in order to study arrangements of objects that satisfy specific conditions (Wilson, 2016). For the purposes of analysing different knot configurations – how different loop, wend and stand positions can be arranged to produce different knots with identical Conway tangles – combinatorics can be useful. Transformations, group-theory operations employed by mathematicians and physicists in the study of symmetry, help to determine or generate object congruency. There are four basic geometric transformations: rotation, reflection, dilation and translation (Protter & Morrey, 1964). The first two are useful when comparing similar knot structures to establish whether they are identical or opposite in chirality. Chirality, another topic of inconsistency, is the quality of having a mirror image and this will be discussed in further detail later.

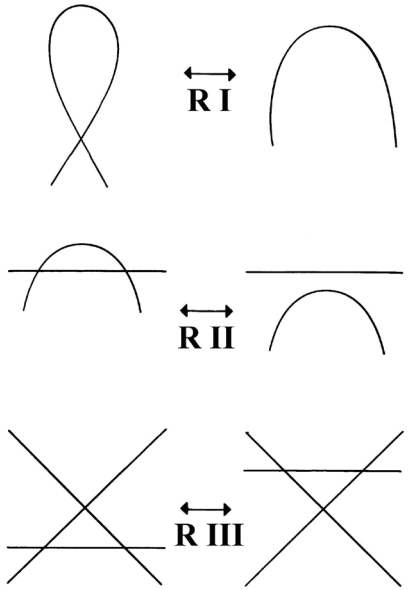


Figure 1 - Reidemeister moves illustrated as generic silhouettes without specific crossings.

"Tales From the Loop"

(The title of a 2020 science fiction series inspired by Simon Stålenhag's digital images)

The Crossing Loop (Figure 2, p 29), a structure with one crossing only, has been called a variety names that are sometimes based on its application and context. Turn, Wrap and Loop are commonly applied terms (Asher, 1989; Ashley, 1944; Montgomery, 1973; Pawson, 2001; Shaw, 1924; Warner, 1992; and others). Mirror-image Crossing Loops have been distinguished as Overhand Loops – not to be confused with the common loop knot based on the Overhand Knot – and Underhand Loops (Fletcher, 1976; and others). However, this distinction does not clarify structural subtleties. Birch (2019a, 2019b) distinguishes the two types of Crossing Loops as either S or Z based

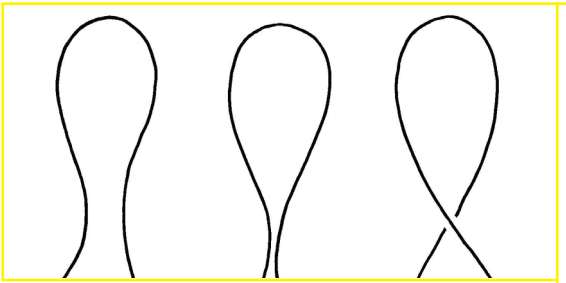


Figure 2 - Loops, from left to right: Open Loop, Closed Loop, Crossing Loop.

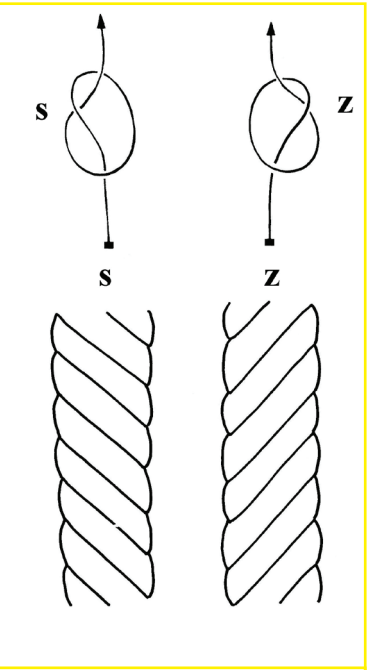


Figure 3 - S and Z Overhand Knot chirality based on textiles standards. When viewed from the front, the mirror-image angles of the strands in hawser-laid ropes are represented by the shape of the letters S and Z. Quipus researchers reverse this nomenclature, presumably based on the strand angle at the back of the rope.

on chirality. The S and Z distinction is derived from textile standards, the twist of hawser-laid ropes, and conventions in other fields (CGSB, 1984; CGSB, 1978; Chisnall, 2000, 2020; ISO, 1969:2004). This labelling system identifies the chirality of commonplace Overhand Knots, Half Hitches and Half Knots for forensic purposes (Chisnall, 2000, 2010) (see Figure 3). Alternative systems have been utilized, sometimes introducing bias: LH and RH, D and L, d and l, N and Z, dextrorotatory and levorotatory, dextral and sinistral, and so forth (Chisnall, 2000). Chirality designations also vary in physics, chemistry and other fields, although "left-handed" and "right-handed" have been traditional terms. Assigning handedness to knots is something to be avoided in forensic science in order to prevent courtroom bias and the misinterpretation of knotted evidence (Chisnall, 2016a). From a forensic standpoint, handedness is a tier's characteristic whereas chirality is the quality of a knot's structure (Budworth, 1985; Chisnall, 2000, 2010; Nute, 1986; Spörri, 2008; Tracy, 2003).[3]

Figure 4, p 30 illustrates Crossing Loop chirality and the designations

3 When it comes to commonplace knots similar to the Trefoil Knot – such as the aforementioned Overhand Knots, Half Hitches and Half Knots – there is no straightforward correlation between tier handedness and knot chirality (Budworth, 1985; Chisnall, 2000, 2010; Nute, 1986). The connection is not binary. Although the tier's dominant hand comes into play when manipulating wends and stands, other factors influence the resulting knot. The number of wends utilized, the specific tying application, the position of the tier relative to the tying task, and other situational details contribute to the complexity of outcomes (Chisnall, 2010).

Overhand and Underhand Loop (Birth, 2019a; Fletcher, 1976). Note that simple rotation and refection transformations reveal which Crossing Loops are equivalent and which ones are mirror images. The S and Z distinction between mirror image Crossing Loops, Overhand Knots and other knots is employed in archeology and other fields. However, those labels have been reversed in the analysis of quipus or khipus (Hyland, et al., 2014; Philips, 2014). This may be a consequence of adopting the lay angle of a hawser-laid rope from the side opposite to the observer (see Figure 3, but visualize the strand lay angles on the unseen side of the ropes). Some archeologists, however, label common knots according to Figure 5 (Wendrich, 1996). Nevertheless, confusing differences appear in the literature. For example, compare Figures 4 and 5 with regard to Crossing Loop chirality. Wendrich's (1996) S-and-Z nomenclature for Egyptian knots – specifically Crossing Loops – differs from the standard illustrated in Figure 4. (This may have been a transposition error missed during editing.)

As shown in Figure 6, p 31 wrapping a rope or cord around a solid anchor

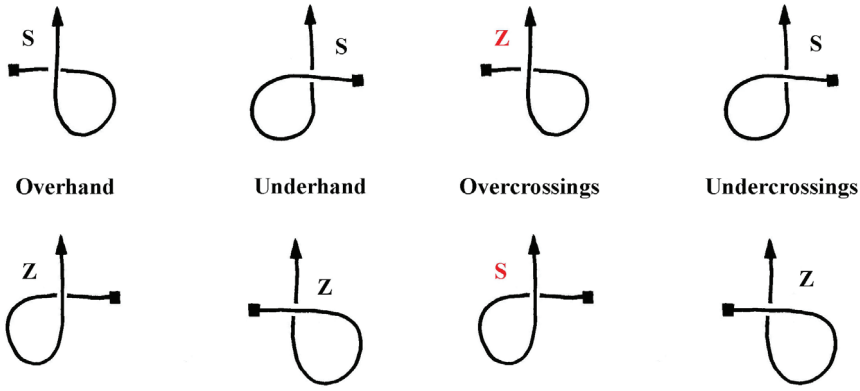


Figure 4 - Conventional Crossing Loop chirality designations, matching Overhand Knot chirality. The S and Z designations for Crossing Loops are derived from the initial crossing, as if one were tying an Overhand Knot. The next crossing would place the wend within the bounded loop area, and the wend would cross a third time to exit the bounded area, thus completing the Overhand Knot. The top two images are equivalent with a y-axis rotation. The same rotation matches the bottom two images. The overhand and underhand designations signify the location of the working end. A reflection transformation is required to match S and Z.

Figure 5 - Crossing Loop chirality designations employed in archaeology, not completely matching standard Overhand Knot chirality (from Wendrich, 1996). Note the left two images have reversed chirality designations. In conventional terms, the upper left configuration should be S and the lower left should be Z. Although the standard S and Z Overhand Knots (Figure 3) are recognized in the study of knotted Egyptian artefacts and images, the rationale for reversing the chirality of these two configurations is unclear. Perhaps this was a transposition error missed during editing.

point can yield a number of quite similar structures that have been identified by a variety of names: Turns, Closed and Open Turns, Half Hitches, Crossing Loops, Hitches and so on. Once again, Birch examined this in detail (2019a, 2019b). These terms often depend on the subtle relationship of one side of the rope to the other. Are they separated, do they touch, or does one cross the other? The terminology applied to these structures varies throughout mainstream knotting guides. See Ashley (1944), Asher (1989), Bigon and Regazzoni (1981), Budworth (1983, 1985, 1999), Burgess (1979), Day (1953), Fletcher (1976), Gibson (1979), Jacobson (2008), Pawson (2001), Shaw (1924), and others.

Figure 6 - Turns, from left to right: Half Hitch or Crossing Loop, Closed Turn, Open Turn. Other names have been applied.

"Elbow Room: The Varieties of Free Will Worth Wanting"
(The title of a 1984 book on determinism and free will by philosopher Daniel Dennett)

The humble Elbow is a simple two-crossing structure that is sometimes referred to as a Twist (Budworth, 1985; Chisnall, 2000 Warner, 1992) It is the foundation of a number of knot structures and the source of periodic confusion. The fact that knots are chiral or have mirror images can muddy the water further. As Budworth (2010) and Birch (2019a, 2019b) have pointed out, distinguishing between Half Hitching and Marline Hitching has sometimes baffled even those with ample knotting and sailing experience (Marline, Marlin and Marling seem to be interchangeable spellings across the knotting literature and on line – yet another inconsistency.).

Figure 7 depicts the mirror-image versions of Half Hitching and Marline Hitching, sequential constructs that build on the repetition of Elbows or apparent Elbows (more about this later). Traditionally, these have had various applications in lashing and parcelling (Ashley, 1944). The starting point and the

direction of travel are not important to the type of hitching. However, in all four methods illustrated, the tying actions proceed to the right. A secure hitch – such as a Clove Hitch, Timber Hitch or something equally effective – is employed to anchor the stand on the left in all four structures depicted in Figure 7. The wend is signified by an arrow, and it would be secured once the lashing had been completed. Whether the Half Hitching has S or Z chirality, the working end is always tucked under the Turn and then passed over top, travelling axially to the next hitch. In contrast, Marline Hitching involves passing the working end over the Turn, tucking it underneath, then moving axially to the next hitch. As Ashley (1944), Budworth (2010) and others point out, Half Hitching falls apart when removed from whatever solid anchor point or unknotable entity to which it has been attached (a spar, post or the equivalent). Marline Hitching collapses into a string of Overhand Knots when removed. These outcomes will be significant later.

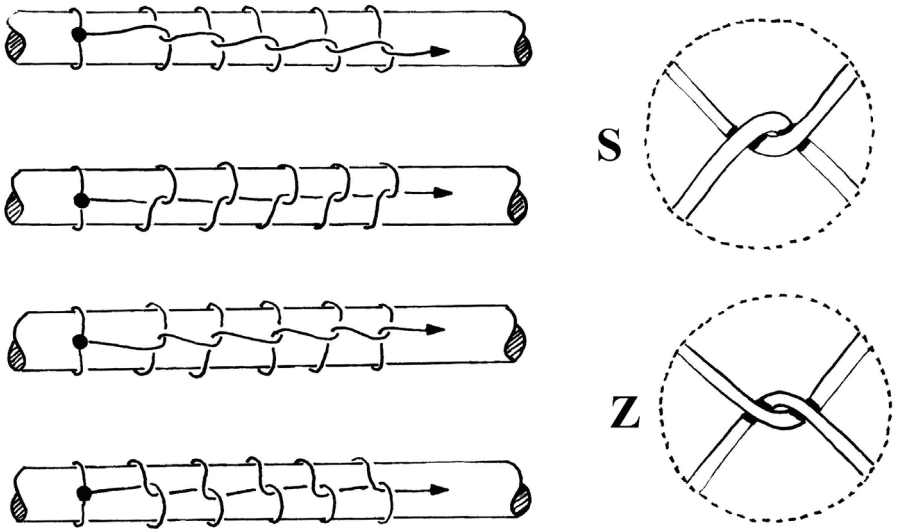


Figure 7 - From top to bottom: S Half Hitching, S Marline Hitching, Z Half Hitching, Z Marline Hitching

An inevitable question now emerges: What is a Half Hitch? Birch (2019b) thoroughly explored Half Hitches by looking into historical records and drawing on multiple authoritative sources relating to classical and nautical tying practices. Essentially, setting aside minor functional and contextual details, his literature review indicates that the term Half Hitch refers to two fundamentally different structures – three if you include an unanchored Half Hitch, which is topologically equivalent to an Overhand Knot – both stemming from the simple two-crossing Elbow.

Reidemeister moves differentiate the Elbows in the two types of hitching. Figure 8 p 33, depicts both chiral forms of the Elbow as isolated Conway tangles showing only the two crossing points but no context. As previously mentioned, context constitutes function, orientation, the relationship to neighbouring knot structures, the location of wends and stands, and the position of the solid or fixed object to which the hitch may be attached. (Elbows and hitches illustrated in isolation are observed out of context. Marline and Half Hitching are sequences rather than single formations.) As can be seen, rotating those Conway tangles forty-five degrees clockwise or counterclockwise relative to the rigid anchor point determines whether the resulting structure is part of Half Hitching or Marline Hitching. Furthermore, the four stand-alone hitches in the first row

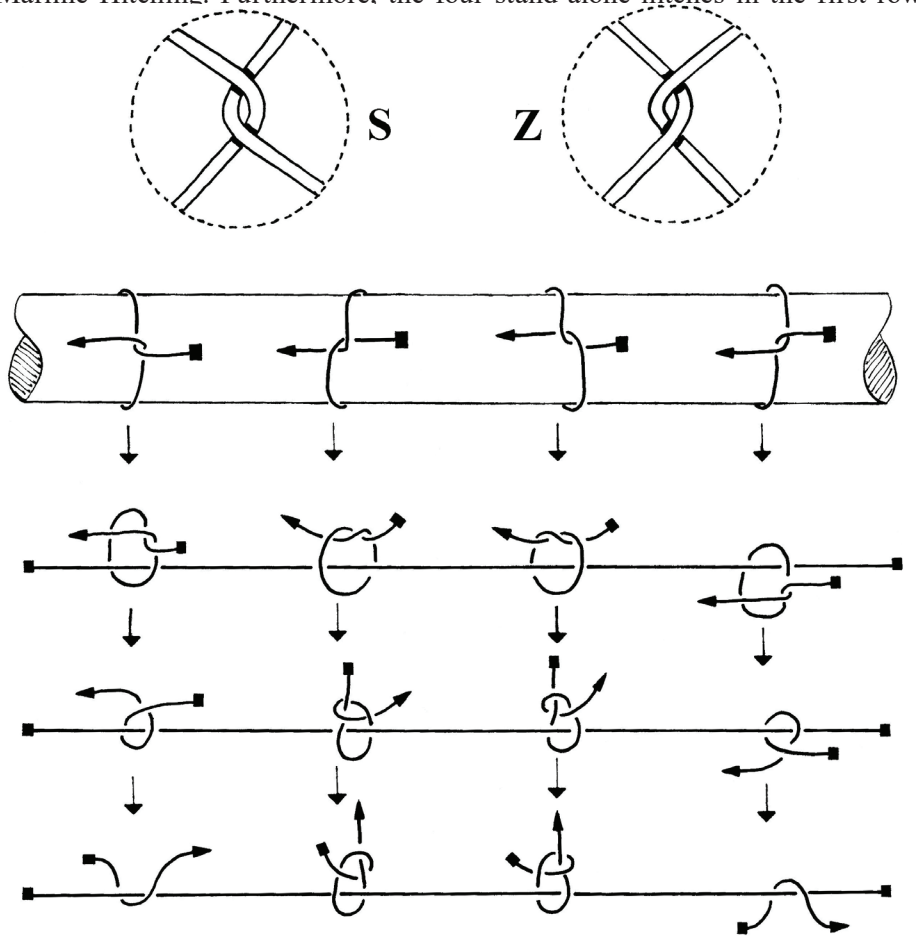


Figure 8 - Hitching topology from top to bottom: Conway tangles of S and Z Elbows; isolated Half Hitching and Marline Hitching; crossings revealed; Reidemeister moves applied in bottom two rows.

below the Conway tangles illustrated in Figure 8 are tied around a solid entity with substantial diameter, as would be observed in real-world practice. This kind of depiction obscures some of the essential crossing points that determine overall structure.

The next row down in Figure 8 shows the same four hitches around a thin line, which represents an inflexible entity having no thickness, thus revealing all essential crossing points. To eliminate nonessential crossings, a Reidemeister II move has been applied to the Half Hitching structures in the next row down, indicating that it actually has a crossing number of three. It could easily fall apart and separate from the unknotable object at this point because additional manipulations can reduce the crossing number to two, as seen in the bottom row, and eventually zero. In comparison, the Marline Hitching becomes an Overhand Knot tied around another object, having a crossing number of five, and it could be called a Half Knot if both wends were employed simultaneously in the tying (Chisnall, 2020; Hage, 2007). That number cannot be reduced unless the wend is untucked. If separated from that unknotable object or solid, the unattached Overhand Knot retains its structure and has a crossing number of three. By applying Reidemeister moves, the Half Hitching disappears, while the Overhand Knot can flip to a Half Hitch and vice versa. A single Marline Hitch, which ostensibly appeared to be a two-crossing Elbow, was actually a five crossing structure that could not be further reduced using Reidemeister moves. In contrast, a lone so-called Half Hitch, also having an apparent crossing number of two, actually has a crossing number of three or less owing to Reidemeister simplification. Ironically, from this perspective, the components of Marline Hitching are Half Hitches while Half Hitching comprises insecure Crossing Loops. With careful attention to tying action, chirality, structural orientation, and exact crossing number, the simple Elbow can reveal its true structure and integrity within its practical context and function.

Counter intuitively, many higher-order knots with more crossings are easier to identify, distinguish and label. However, there are exceptions involving subtle differences. Moving to four crossings, a planar Figure Eight contains two Elbows of opposite chirality. Hence, to topologists, it has no mirror image because a topological Figure Eight Knot has no ends. When it comes to static real-world knots, however, the Figure Eight is chiral because it has mirror images relative to its working end, as can be seen in Figure 9 p 35 (Chisnall 2016b). This is a convention adopted by researchers of Peruvian quipus (Phillips, 2014). Any Figure Eight can flip to a Pretzel Knot using Reidemeister moves, as seen at the bottom of the same drawing. If the flipping proceeds in the same direction, a mirror-image Figure Eight appears, then a mirror-image Pretzel Knot, and

finally the original Figure Eight configuration. Without ends, the Figure 9 Eight Knot and Pretzel Knot are amphichiral or achiral because they are topologically equivalent via Reidemeister moves or transformations. Any topological Pretzel Knot can be superimposed on another, and any topological Figure Eight Knot can be matched to another using rotation transformations. This is not the case with static real-world Figure Eights having wends.

"The Left Hand of Darkness"
(The ominous title of the classic 1969 science fiction novel by the late, great Ursula K. Le Guin)

Moving to seven crossings, the Bowline and Sheet Bend present ongoing complications in terms of nomenclature and identification. The four Bowlines depicted in Figure 10 are amongst the most frequently published loop knots. The Bowlines with their wends on the inside of the loop are most often referred to as Bowlines or Bowline Knots, and sometimes Common or Standard Bowlines. The versions with the wend on the outside of the loop are variously labelled Ring Bowlines, Stopper Bowlines, and Cowboy or Cowboy's Bowlines. Similar to the Bowline, there are four common Sheet Bend configurations (which are

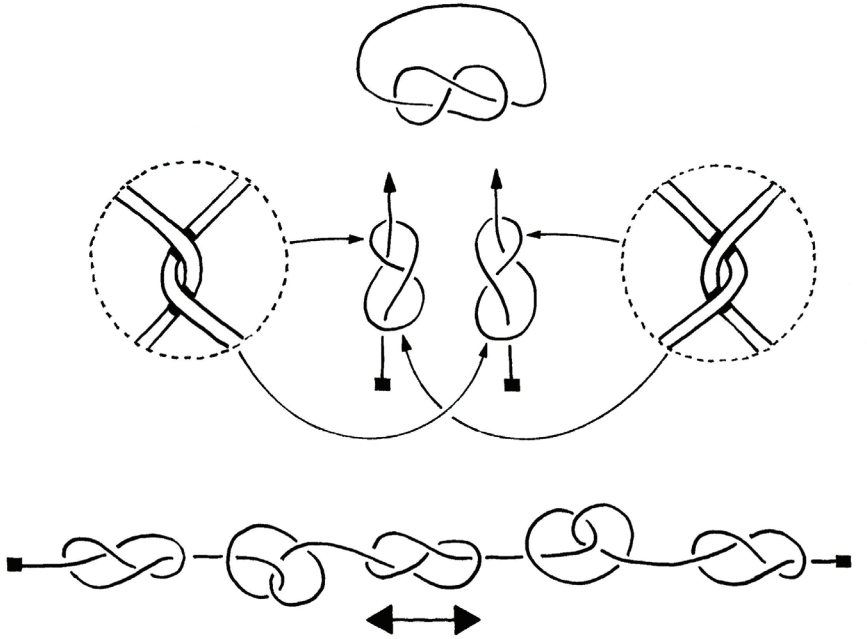


Figure 9 - Figure Eight Knot. From top to bottom: wendless topological Figure Eight Knot; real-world Figure Eights containing both S and Z Elbows, and their chirality based on tying action and wend position; Figure Eight and Pretzel Knot equivalency via flipping (as well as Reidemeister moves).

also known as Sheetbends, Weaver's Knots or Bends, and sometimes Lapp Bends) (see Figure 10).

Based on a perusal of hundreds of historical, modern, specialty, and popular references (too numerous to cite here), as well as on-line images, all four of the Bowlines depicted have at times been confusingly and inconsistently identified as Right-Handed or Right-Hand Bowlines, Left- Handed or Left-Hand Bowlines, Inverted Bowlines and Reverse or Reversed Bowlines.[4] (For a few examples, see Ashley (1944), Asher (1989), Bigon and Regazzoni (1981), Budworth (1983, 1985, 1999), Burgess (1979), Day (1953), Fletcher (1976), Gibson (1979), Graumont and Hensel (1952), Jacobson (2008), Pawson (2001), Shaw (1924), and many others.)

To avoid ambiguity and bias in forensic knot analysis, the mirror image versions or enantiomers of the Bowline and Sheet Bend are distinguished based on the configuration of the Crossing Loop that is intertwined with the Closed Loop within these knots (Chisnall, 2016b, 2020). The rationale for this convention arises from the fact that the Closed Loop has no discernible chirality. The

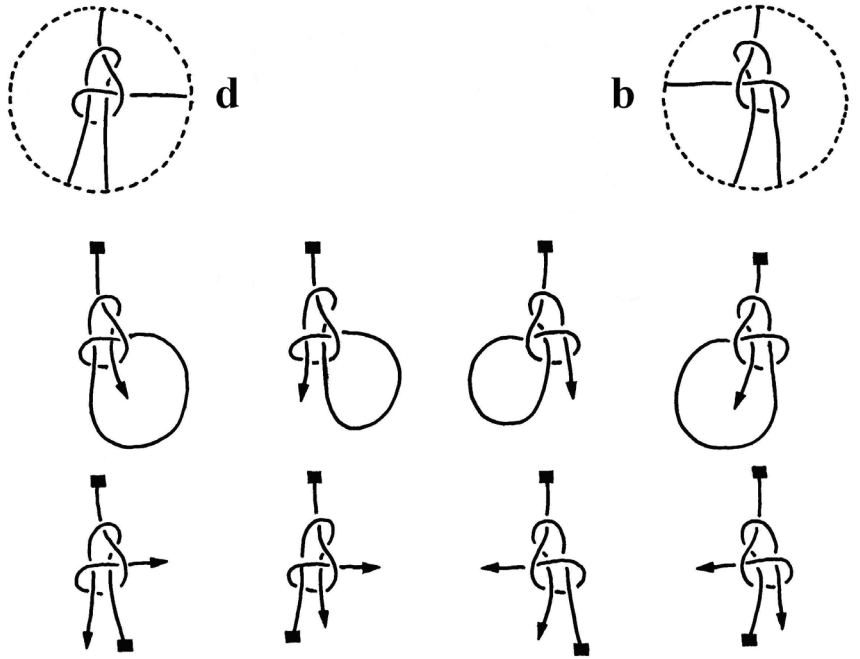


Figure 10 - Bowlines and Sheet Bends. From top to bottom: Conway tangles isolating essential d and b configurations; four types of Bowlines; four types of Sheet Bends.

4 Regarding Bowlines and Sheet Bends, there is no firmly-established correlation between a tier's handedness and the resulting structure because there are many ways of tying both knots in a variety of applications (Chisnall, 2016b).

Crossing Loop does. (A planar Closed Loop will align with any other Closed Loop via x, y or z rotation transformations. As seen previously, Crossing Loops of the same chirality can be superimposed with rotational transformations. However mirror-image Crossing Loop configurations can be matched only with a reflection transformation.) Figure 10 illustrates Conway tangles of these basic structures out of context. In forensic science, the two forms are identified as "d" and "b" based on the shape of their Crossing Loops, irrespective of the location of wends, stands and loops. In order to identify the loop or bend's chirality, the knot must be oriented so that the internal Crossing Loop is optimally visible on one side of the plane according to aspect shifting. The long stem of both lower-case letters is oriented pointing up and it crosses over that portion of the rope or cord forming the internal Crossing Loop. Using this method of identification, along with the basic principles of combinatorics, chiral Bowline variants can be derived as seen in Figure 11. These variants have been called Boas, Panama and Eskimo Bowlines.

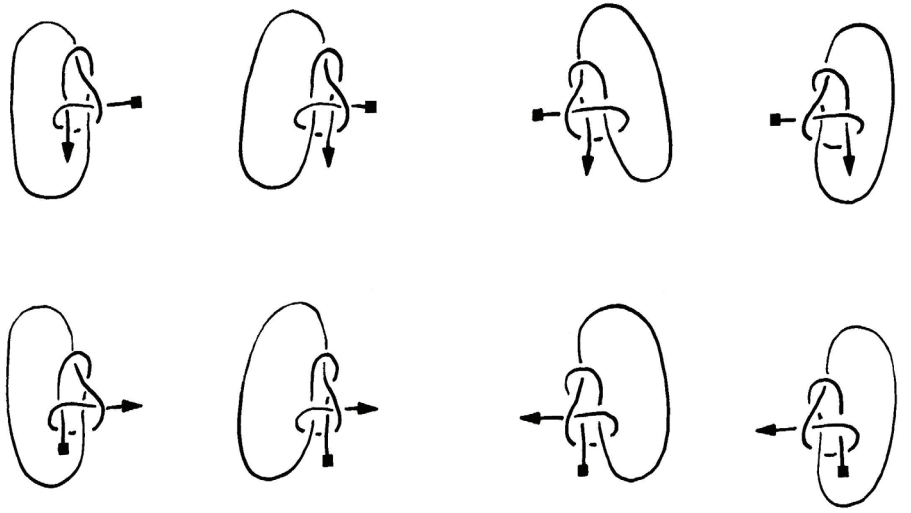


Figure 11 - Boas, Eskimo and Panama Bowlines.

With regard to Sheet Bends, a further distinction is required. Once again, based on an examination of hundreds of references, there appears to be poor agreement when identifying Sheet Bends. The terms Left-Handed or Left-Hand and Right-Handed or Right-Hand Sheet Bends have been employed in a similarly haphazard way. (Again, see Ashley (1944), Asher (1989), Bigon and Regazzoni (1981), Budworth (1983, 1985, 1999), Burgess (1979), Day (1953), Fletcher (1976), Gibson (1979), Graumont and Hensel (1952), Jacobson (2008), Pawson (2001), Shaw (1924), and many other examples.) The d and b distinction helps to keep these enantiomers or mirror images sorted. But the relative location of the

wends and stands lacks consistency. Shaw's (1924) nomenclature addresses this problem. When a bend's wends are on opposite sides in the planar projection, the knot is oblique. If the wends are on the same side in the plane, the bend is direct. Hence, there are four basic types of conventional Sheet Bends: oblique and direct d and b.

Applying combinatorics, other bend configurations can be derived from the two Conway tangles depicted in Figure 10. These are illustrated in Figure 12, some of which are occasionally called Weaver's Knots or Bends, and Whiplash Knots, amongst other names. Not all are reliable bends.[5]

Interestingly, most of the conventional Bowlines depicted in the references reviewed – principally historical and nautical texts and handbooks – are d Bowlines (Chisnall, 2016b). This may be related to performance security and the fact that most natural-fibre hawser-laid lines were constructed with right-hand or Z lay. In contrast, more illustrated Sheet Bends were found to have b construction. With synthetic kernmantel (sheath and core) rescue and climbing ropes, double-braid utility cordage, and contemporary lines used for sailing and marine purposes, knot chirality is not a critical concern. These materials usually have no dominant external lay. However, some cordage may have internal subtleties.

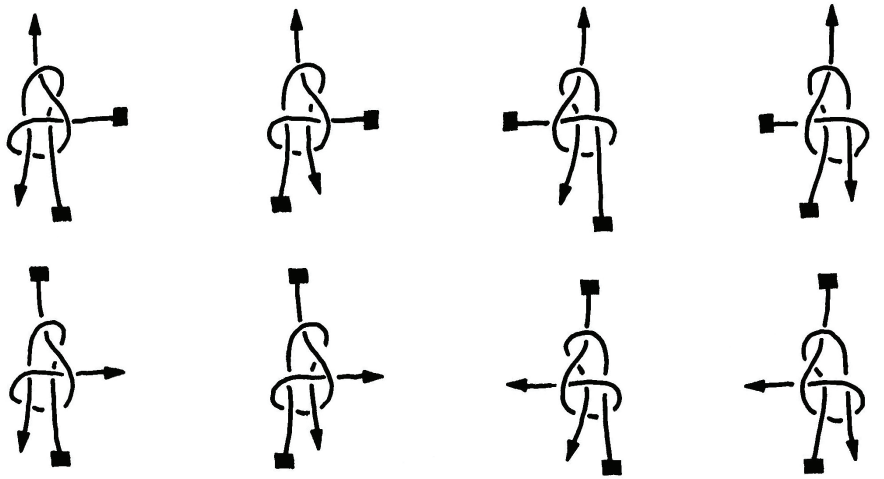


Figure 12 - Top: Weaver's Knots and Whiplash Bends. Bottom: Sheet Bends compared. From left to right: d Oblique, d Direct, b Direct, b Oblique. Oblique and Direct.

5 The questions of utility, security and strength are not addressed here. These qualities vary considerably amongst the loop knots and bends presented based on application, tying material, statistical evaluation of knot efficiency, and the topological twist fluctuation and circulation energies of the various knot structures (Patil, et al., 2020; Chisnall, 2020; Šimon & Ftorek, 2022).

An earlier survey of knot references found disparities in how certain knots were depicted in terms of chirality, and consequently labelling varied (Chisnall, 2016b). The data are summarized in Table A. The connection between the two systems of chirality classification is interesting. By way of irregular or differential loading and other manipulations, b and d Bowlines and Sheet Bends can capsize or spill to form S and Z Slip Loops or Slip Knots, respectively. S and Z designations have been directly applied to Bowline and Sheet Bends (Hamel, 2008; Wendrich, 1996). One such approach utilized topological writhe to establish chirality – wherein crossing points are assigned positive and negative values (Adams, 2001) – which can be time-consuming to use in practice.

Table A. The chirality of knot depictions in a large sample of knot references. Some references had multiple instances of certain knots while others had just one image.

Chirality	Overhand Knot	Figure Eight Knot	Bowline	Sheet Bend	Chirality
S	0%	29.2%	16.7%	50%	b
Z	0%	8.3%	62.5%	10%	d
both	100%	62.5%	20.8%	40%	both

Previous authors have catalogued Bowline and Sheet Bend variants, sometimes with duplications, omissions and inconsistent chiralities. Of course the knots presented in Figure 10 p 36 through Figure 12 p 38 do not cover all possibilities. Warner (1992) outlined several related links and mesh knots, which are not shown here. From a topological standpoint, there are at least four more configurations without wends based on the Conway tangles illustrated in Figure 10. These are shown in Figure 13. Two enantiomers are true topological knots without ends, having mathematical designations that are irrelevant to this discussion. The other two enantiomers are topological links, comprising two distinct continuous loops. By applying the appropriate Reidemeister moves described earlier in the correct order, the tangled links depicted can be reduced to Hopf Links: connected pairs of simple rings, each link having only two crossing points in the plane – an Elbow.

Cut or Untangle this Gordian Knot?
(See the Greek legend of Alexander the Great in Gordium, Phrygia, 333BC)

It is no surprise beginners can get befuddled when learning basic knotcraft. Not only do they have to deal with sequential spatial-visual esoterica, multiple knot forms, chirality, aspect shifting, personal handedness habits and brain laterality, but also the associated disparate language (Bullemer, et al., 1989;

Cross, et al., 2017; Huff & Schwan, 2012). Additionally, knot afficionados can have difficulty teaching and communicating about knots, as well as agreeing on acceptable conventions. Just a few examples of inconsistency, ambiguity and confusion were presented here. They are part of the much larger issue of standardizing practical knotting terminology and accurately cataloguing all historical and contemporary knots. This is something chemists have successfully accomplished with regard to organic and other compounds, suggesting chemical cataloguing as a possible model worth emulating. Frank Brown, a retired chemist and Guild member, pointed this out years ago.

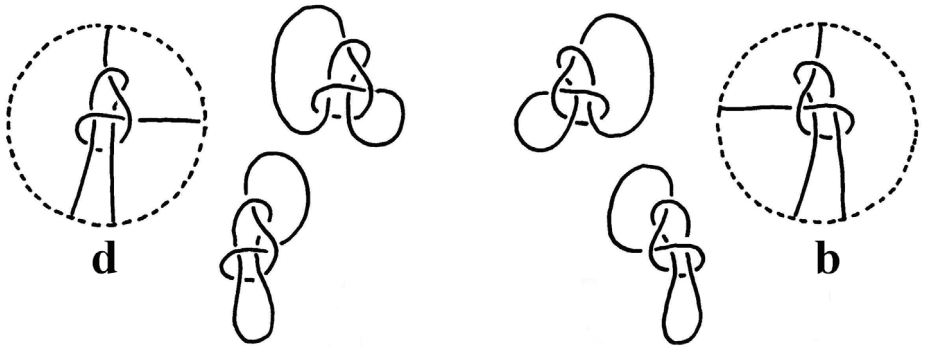
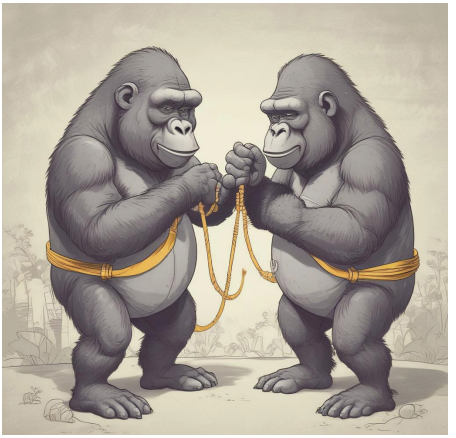


Figure 13 - Topological knots and links, with Conway tangles on the outside and topological configurations on the inside. Top: chiral topological knots. Bottom: chiral links that can be simplified to Hopf Links or joined rings.

Topologists have catalogued all wendless knots and links up to at least 15 crossings. (See *Knot Atlas* and *KnotInfo: Table of Knots* on line.) Kauffman (1987) and Rolfsen (1990) document knot diagrams up to nine crossings. This has not been done effectively with practical knots. How can knots be unambiguously and clearly labelled, thus facilitating the recognition of identical, similar and different formations? Should knots be classified and identified according to essential structure (likely using some sort of mathematical coding), or should they be catalogued according to their specific function, application, and tying actions (likely with verbal and mathematical coding)? Would a hybrid of both strategies be best (Lestel & Herzfeld, 2005; Scalon, et al., 2016, 2019; Strohecker, 1991, 1996; van de Griend, 1992)? Language by its nature invites debate but, as the old saying goes, a picture is worth a thousand words. Mathematics and science are rigorous and precise, but esoteric and often inaccessible without some time and effort. Nevertheless, various academic disciplines have developed tools that could be of use to practical knot tiers. The blending of science and math with tradition and lore is the challenge. How will knotting terminology and potential standardization evolve in the future?

Perhaps knot names and knotting terminology should be determined according to their areas of specialization. However, even then there will be disparity. Considering the extensive and colourful history of knot tying, the possibility of agreement and standardization is doubtful. Maybe that is a good thing. Multiple and alternative perspectives encourage variety, invention and exploration that engage knot tiers of all backgrounds and interests.

References — Rob Chisnall's article contains many useful references that, unfortunately, could not fit into this publication. Please login to the IGKT.NET website for the article and full reference list. https://bit.ly/KM163



"It gets easier once you get past the sequential spatial-visual esoterica, multiple knot forms, aspect shifting, chirality, and your personal handedness habits and brain laterality".

"Beats me. According to Chisnall, I may have flipped chirality in my S and Z crossing loops".

Ed — All characters and incidents portrayed in *Knotting Matters* cartoons are fictitious. No identification with actual persons (living or deceased), places, buildings, products, or events is intended or should be inferred. No animals were harmed in the making of these cartoons.

Branch News

International Guild of Knot Tyers—North America

Save the Date

The IGKT-North America will be holding their annual AGM on Saturday, October 5th, 2024. Here are the details:

The cost will be $30 for entry into the event. This will include our traditional Display Day, demonstrations, and offer talks, membership meeting and the IGKT half-yearly meeting; all aboard the historic ferry boat Berkeley. The IGKT-North America will be presenting its constitution for ratification at the AGM, so this will be an important event for members to attend. The entire event will take place at the Maritime Museum of San Diego, California, USA. The museum is 0.3km directly across the street from our host hotel, the Wyndham San Diego Bayside, 1355 N Harbor Drive San Diego, CA 92101. The hotel is offering a limited special reduced rate through this link: https://book.passkey.com/go/IGKT

Berkeley ferryboat
San Diego Maritime Museum

Following the meeting, we will be holding our traditional Knot Tyers Supper & Fundraiser, with entry tickets at $45 per person. This fundraiser is our sole fundraising event for the year. We hope that attendees will be generous with their donations and purchases. Anyone who cannot attend but is interested in donating can contact the IGKT-NAB for additional information at contactus@igktna.org.

On Friday, October 4th there will be a special charted sail aboard the galleon San Salvador. The cost is $50 (Due to generous sponsorship, this is priced at a significant discount.) This is a replica of the early Spanish galleon ship that arrived on the west coast of the Americas in 1542. Attendees can assist

San Salvador
Photo credit Jerry Soto

with the sailing of this ship or just enjoy sailing in the harbor (and potentially out on the ocean). The San Salvador was built by the Maritime Museum of San Diego and was toured at a past AGM while still under construction. There are preliminarily forty seats available, but we do expect to have an exact count for availability in July, when reservations open.

USS Midway

As an added benefit to AGM attendees, there will be a limited number of free entry tickets available which were generously donated to the IGKT-NA for guests to tour the USS aircraft carrier Midway, located 0.7km from the host hotel, and a simple walk from the Maritime Museum.

San Diego International airport (SAN) is 3.6 km from the hotel. There are other nearby airfields for those who would like to fly-in to the event. A free airport shuttle is available from SAN to the Wyndham Hotel.

IGKT Australia Meeting

Venue - Hobart Town Hall
Register at www.australisknots.com.au

5-6 Feb - Closed IGKT Meeting & Dinner

7-10 Feb - Public Exhibitions, Demonstrations, Tutorials as part of the the Australian Wooden Boat Festival

Knotty Volunteers Needed!
Fender making tutorials
Children's knot tying activities
Knot Tying Demonstrations & Competitions

Please contact Barbara.Frankel66@gmail.com
to help with festival activities

https://australianwoodenboatfestival.com.au/
https://www.hobarttravelcentre.com.au

Hobart 5-10 Feb '25

The IGKT France AGM in April, 2024 was held in Chateauneuf-sur-Loire in the « Musée maritime de Loire ». There were 47 attendees among which Colin Byfleet and Jackie, David Pepper and Sue, Richard Hopkins from the UK.

General Assembly IGKT France 7-april 2024. Châteauneuf-sur-Loire (32 of 47)

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North American Branch - Mid-Atlantic Region - USA
All enquries about this branch: contact the Guild's Web Administrator.

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www.igktpab.org/
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Venue: Via Zoom, Contact Peter for details

All chapter details as on IGKT website on 24/05/2024

back cover graphic: Paracord Keychains by Alex Kamenski, see p 7.

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